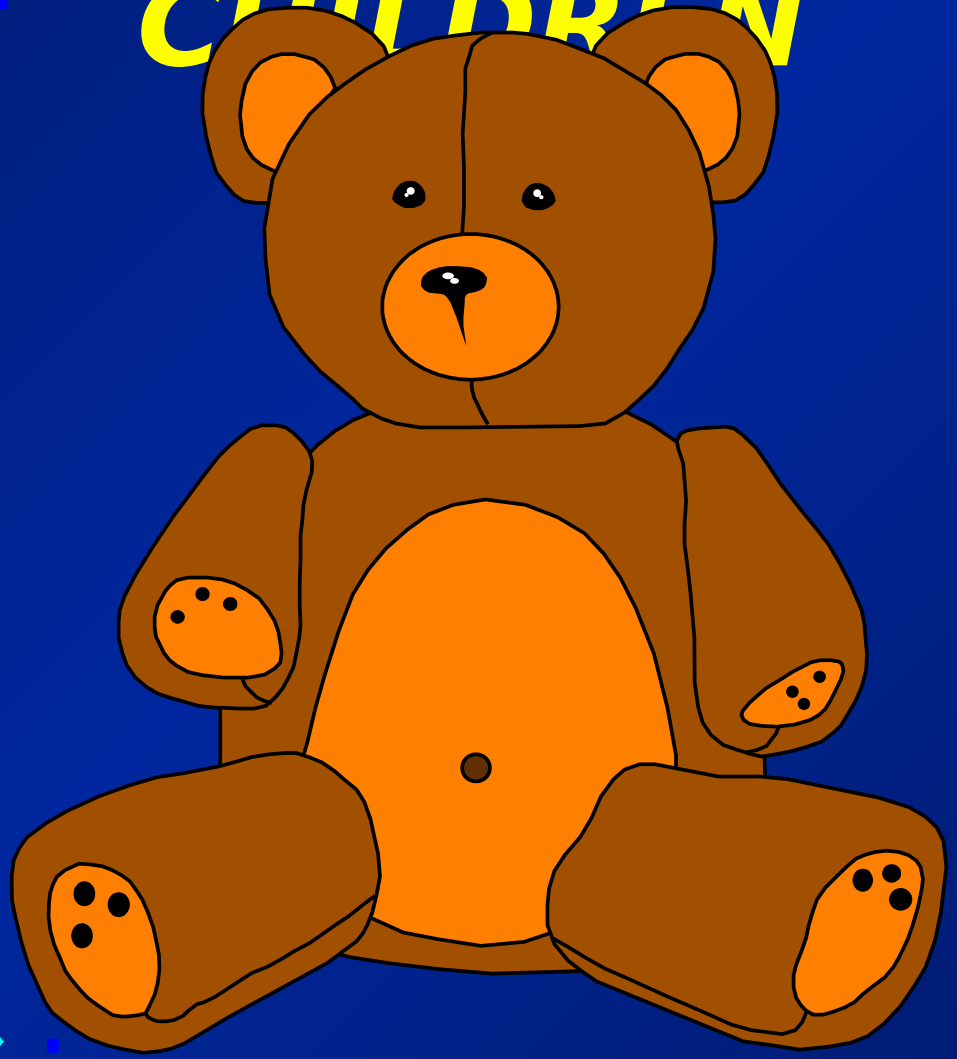
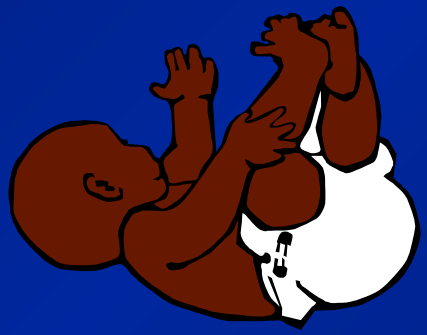
INFANTS AND CHILDREN

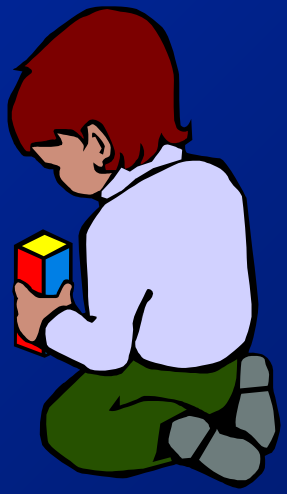


Lesson Objectives:

Identify the developmental stages of the human body for:

- **Infants**
- **Toddlers**
- **Pre-School**
- **School Age**
- **Adolescent**





Objectives:

Infants and Children

- Causes of respiratory emergencies
- Oxygen therapy
- Assessment
- Common Problems
- Trauma
- Child Abuse and Neglect

Objectives:

- Infants and Children with Special Needs
- Family Response
- Provider Response

The Human Body

Developmental Concerns of Newborns and Infants - birth to 1 year of age:

- **Minimal stranger anxiety**
- **Do not like being separated from parents**
- **Do not want to be suffocated by an O_2 mask**
- **Need to be kept warm - make sure hands and stethoscope are warm before touching**

Newborn and Infant

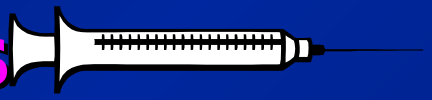
Breathing rate **best obtained from a distance** - watch chest rise, note color and level of activity.

Examine heart and lungs 1st, head last

Toddler - 1 to 3 years old

- Do not liked to be touched
- Do not like to be separated from parents
- Do not like having their clothing removed
  - "Remove - Exam - Replace"
- Do not want suffocated by O_2 mask
- Assure child that he was not bad, children tend to think that their illness or injuries is punishment

Toddler - 1 to 3 years old

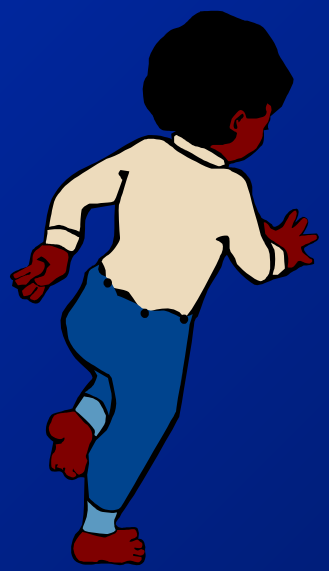
- Afraid of needles 
- Fear of pain
- Should be examined trunk to head approach

Preschool 3-6 years of age

- Do not liked to be touched
- Do not liked to be separated from parents
- Do not like having their clothing removed

  "Remove - Exam - Replace"
- Do not want to be suffocated by O_2 mask
- Assure child that he/she was not bad

PRE-SCHOOL
3 to 6 years of age



- Afraid of blood
- Fear of pain
- Fear of permanent injury
- Modest

School Age
6 - 12 years

- Afraid of blood
- Fear of pain
- Fear of permanent injury
- Modest
- Fear of disfigurement

Adolescents age 12-18 years

- Fear of permanent injury
- Modest
- Fear of disfigurement
- Treat them as adults
- These patients may desire to be assessed privately, away from parents of guardians

Anatomical and Physiological Concerns - Airway

- Secretions and airway swelling easily block small airways
- The tongue is large compared to a smaller mandible and can block the airway in an unconscious infant or child.

Anatomical and Physiological Concerns - Airway

- Position the airway. **Do not hyperextend the neck.**
- Infants are **obligate nose breathers**, so suctioning a secretion filled nasopharynx can improve breathing problems in an infant.

Anatomical and Physiological Concerns - Airway

- Children compensate well for short periods of time
  - Compensate by increasing breathing rate and increased effort of breathing.
  - Compensation is followed rapidly by decompensation due to rapid respiratory muscle fatigue and general fatigue of the infant.

Airway

Specific Skills

- Airway opening
  - –Position to open airway is different

    “head-tilt chin-lift”

    Do not hyperextend

  - –Jaw thrust with spinal immobilization

Suctioning

- Sizing
- Depth
  - Gag Reflex
  - Vagus Nerve
- Technique

Clearing complete obstructions

Infants < 1 year old

- Back blows - chest thrust
- Visual foreign body removal

Clearing complete obstructions

Children

- Abdominal thrust

- Visual foreign body removal

Airway adjuncts

- Oral airways
  - Adjunct, not for initial artificial ventilation
  - Should not have a gag reflex
  - Sizing

Airway adjuncts

- **Techniques of insertion - use tongue depressor.**
- **Insert tongue blade to the base of tongue.**
- **Push down against the tongue while lifting upward.**
- **Insert oropharyngeal airway directly in without rotation.**

Airway adjuncts(cont'd)

- Nasal airways
  - Adjunct not for initial artificial ventilation
  - Sizing
  - Technique of insertion
  - Should not be used in head trauma

Oxygen delivery

- Nonrebreathers
- Blow by techniques
  - Hold tubing in front of patient's face
  - Insert tubing into a paper cup

Artificial ventilations

- Mask sizing/bag sizing
- Trauma considerations
- Mask seal
  - Two hand
  - One hand
- Mouth-to-mask artificial ventilations
  - Visual foreign body removal

Clearing complete obstructions

- **Infants <1 year old**
  - **Back blows/chest thrusts**
- **Children >1 year old**
  - **Abdominal thrusts**
  - **Visual foreign body removal**

Use of bag-valve-mask

- **Squeeze bag slowly and evenly enough to make chest rise adequately.**
- **Rates for child and infant are 20 breaths per minute.**
- **Provide oxygen at 100% concentration by using an oxygen reservoir.**

Assessment

General impression: well versus sick

- **Assess mental status.**
- **Effort of breathing**
- **Color**
- **Quality of cry/speech**

Interaction with environment and parents

- **Normal behavior for child of this age.**
- **Playing**
- **Moving around**
- **Attentive versus non-attentive**
- **Eye contact**
- **Recognizes parents**
- **Responds to parents calling**

General Impression

Emotional State

Response to the EMT-

Approach to evaluation

Begin from across the room

- **Mechanism of injury**
- **Assessment of surroundings**
- **General impression of well versus sick**

Approach to evaluation(cont'd)

- **Respiratory assessment**
  - Note chest expansion/symmetry
  - **Effort of breathing**
  - Nasal flaring
  - Stridor, crowing, or noisy
  - Retractions
  - Grunting
  - Respiratory rate

Approach to evaluation(cont'd)

- **Perfusion assessment**
  - **skin color**

Hands on approach to infant or child patient assessment

- **Assess breath sounds**
  - **Present**
  - **Absent**
  - **Stridor**
  - **Wheezing**

Assess circulation

- Assess brachial or femoral pulse
- Assess peripheral pulses
- Assess capillary refill
- Assess blood pressure in children over 3 years of age, use appropriate size cuff
- Assess skin color, temperature and moisture

Detailed physical exam - begin with a trunk to head approach.

- **Situation and age dependent.**
- **Should help reduce the infant or child's anxiety.**

Common Problems in Infants and Children

Airway obstructions

- **Partial airway obstruction - infant or child who is alert and sitting.**
  - **Stridor, crowing, or noisy**
  - **Retractions on inspiration**
  - **Pink**
  - **Good peripheral perfusion**
  - **Still alert, not unconscious**

Emergency medical care

- Allow position of comfort, assist younger child to sit up, do not lay down. May sit on parents lap.
- Offer oxygen
- Transport
- Do not agitate child
- Limited exam. Do not assess blood pressure.

Complete obstruction and altered mental status or cyanosis and partial obstruction.

- **No crying or speaking and cyanosis.**
  - **Child's cough becomes ineffective**
  - **Increased respiratory difficulty accompanied by stridor**
  - **Victim loses consciousness**
  - **Altered mental status**

Clear airway

- Infant foreign body procedures.
- Child foreign body procedures.

Attempt artificial ventilation's with a bag-valve-mask (BVM) and good seal

Respiratory Emergencies

- **Recognize the difference between upper airway obstruction and lower airway obstruction**
  - **Upper airway obstruction**
    - **Stridor on inspiration**

Lower airway disease

- **Wheezing and breathing effort on exhalation**
- **Rapid breathing (tachypnea) without stridor**

Complete airway obstruction

- No crying
- No speaking
- Cyanosis is present
- No coughing

Recognize signs of increased effort of breathing

- **Early respiratory distress is indicated by any of the following:**
  - **Nasal flaring**
  - **Intercostal retraction (neck muscles), supraclavicular, subcostal retractions**
  - **Stridor**
  - **Neck and abdominal muscles retractions**
  - **Audible wheezing**
  - **Grunting**

The presence of signs of symptoms of early respiratory distress and any of the following:

- Rate >60
- Cyanosis
- Decreased muscle tone
- Severe use of accessory muscles
- Poor peripheral perfusion
- Altered mental status
- Grunting

Respiratory arrest

- Breathing rate less than 10 per minute
- Limp muscle tone
- Unconscious
- Slower, absent heart rate
- Weak or absent distal pulses

Emergency medical care

- **Provide oxygen to all children with respiratory emergencies.**
- **Provide oxygen and assist ventilation for severe respiratory distress.**

Emergency medical care

- Respiratory distress and altered mental status
- Presence of cyanosis with oxygen
- Respiratory distress with poor muscle tone
- Respiratory failure
- Provide oxygen and ventilate with bag-valve-mask for respiratory arrest.

Seizures

- Seizures in children who have chronic seizures are rarely life-threatening. However, seizures, including febrile, should be considered **life-threatening** by the EMT.
- May be brief or prolonged.

Seizures(cont'd)

- Assess for presence of injuries which may have occurred during seizures.
- Caused by fever, infections, poisoning, hypoglycemia, trauma, decreased levels of oxygen or could be idiopathic in children.

Seizures(cont'd)

- **History of seizures. Ask the following questions:**
  - **Has the child had prior seizure(s)?**
  - **If yes, is this the child's normal seizure pattern?**
  - **Has the child taken his anti-seizure medications?**

Emergency medical care - Seizures

- Assure airway position and patency
- Position patient on side if no possibility of cervical spine trauma
- Have suction ready
- Provide O_2 and if in respiratory arrest or severe respiratory distress, assure airway position and patency and ventilate with BVM

Emergency medical care - Seizures(cont'd)

- **Transport**
  - **Although brief seizures are not harmful, there may be more dangerous underlying condition**

Emergency medical care - Seizures(con't)

- **Seizures can be caused by head injury**
- **Inadequate breathing and/or altered mental status may occur following a seizure**

Altered mental status

- Caused by a variety of conditions
  - Hypoglycemia
  - Poisoning
  - Post seizure
  - Infection
  - Head trauma
  - Decreased oxygen levels
  - Hypoperfusion (shock)

Altered mental status

- **Emergency medical care**
  - **Assure patency of airway**
  - **Be prepared to artificially ventilate and or suction**
  - **Transport**

Poisonings

- Common reason for infant and child ambulance calls
- Identify suspected container through adequate history. Bring container to receiving facility if possible.

Emergency medical care - Responsive patient

- Contact medical control
- Consider need to administer activated charcoal
- Provide Oxygen
- Transport
- Continue to monitor - patient may become unresponsive

Emergency medical care - Unresponsive patient

- Assure patency of airway
- Be prepared to artificially ventilate
- Provide oxygen if indicated
- Call medical control
- Transport
- Rule out trauma, trauma can cause altered mental status

Fever

- Common reason for infant or child ambulance call
- Many causes - rarely life threatening
  A severe cause is meningitis
- Fever with a rash is a potentially serious consideration
- Emergency medical care:
  - Transport -- Be alert for seizures

Shock (hypoperfusion)

- Rarely a primary cardiac event
  - Common:
    - Diarrhea and dehydration
    - Trauma
    - Vomiting
    - Blood loss
    - Infection
    - Abdominal injuries

Shock (hypoperfusion)

- **Less Common:**
  - **Allergic reactions**
  - **Poisoning**
  - **Cardiac**

Signs and Symptoms

- Rapid respiratory rate
- Pale, cool, clammy skin
- Weak or absent pulse
- Delayed capillary refill
- Decreased urine output
  - Measured by asking parents about diaper wetting and looking at diaper

Signs and symptoms(cont'd) - hypoperfusion

- **Mental status changes**
- **Absence of tears, even when crying**

Emergency Medical Care

- Assure airway/oxygen
- Be prepared to artificially ventilate
- Manage bleeding if present
- Elevate legs
- Keep warm
- Transport. Note need for rapid transport of infant and child patients with secondary exam completed en route, if time permits.

Near Drowning

- Artificial ventilation is top priority.
- Consider possibility of trauma.
- Consider possibility of hypothermia.
- Consider possible ingestion, especially alcohol.
- Protect airway, suction if necessary.

Near Drowning (con't)

- **Secondary drowning syndrome - Deterioration after breathing normally from minutes to hours after event. All near drowning victims should be transported to the hospital.**

Sudden Infant Death Syndrome (SIDS)

- Signs and symptoms:
  - Sudden death of infants in first year of life.
  - Causes are many and not clearly understood.
  - Baby most commonly discovered in the early morning.

SIDS

- **Emergency Medical Care:**
  - **Try to resuscitate unless rigor mortis.**
  - **Parents will be in agony from emotional distress, remorse and imagined guilt.**
  - **Avoid any comments that might suggest blame to the parents.**

Trauma

- Injuries are the number one cause of death in infants and children.

- Blunt injury is most common.
  - The pattern of injury will be different from adults.

Trauma (con't

- Motor vehicle crashes
  - Motor vehicle passengers
    - Unrestrained passengers have head and neck injuries.
    - Restrained passengers have abdominal and lower spine injuries.

Trauma (con't) Motor Vehicle Crashes

- **Struck while riding bicycle - head injury, spinal injury, abdominal injury**
- **Pedestrian struck by vehicle - abdominal injury with internal bleeding, possible painful, swollen, deformed thigh, head injury.**

Trauma (con't)

- **Falls from height, diving into shallow**

water - head and neck injuries

- **Burns**
- **Sports injuries - head and neck**
- **Child abuse**

Trauma (con't) Specific Body systems

- **Head**
  - **The single most important maneuver is to assure an open airway by means of the modified jaw thrust.**
  - **Children are likely to sustain head injury along with internal injuries.**

Trauma (con't) Specific Body systems

- Respiratory arrest is common secondary to head injuries and may occur during transport.
- Common signs and symptoms are nausea and vomiting.
- Most common cause of hypoxia in the unconscious head injury patient is the tongue obstructing the airway. Jaw-thrust is critically important

Trauma (con't) Specific Body Systems

- **Do not use sandbags to stabilize the head because the weight on child's head may cause injury if the board needs to be turned for emesis.**

Trauma (con't) Specific Body Systems

- **Chest**
  - **Children may have very soft pliable ribs**
  - **there may be significant injuries without external signs**

Trauma (con't) Specific Body Systems

- **Abdomen**
  - **More common site of injury in children than adults**
  - **Often a source of hidden injury**
  - **Always consider abdominal injury in the multiple trauma patient who is deteriorating without external signs**

Trauma (con't) Specific Body Systems

- Air in the stomach can distend abdomen and interfere with artificial ventilation efforts
- Extremities - extremity injuries are managed in the same manner as adults

Trauma (con't) Other Trauma Considerations

- Pneumatic antishock garments
  - Use only if child fits
  - Indications - trauma with signs of severe hypofusion and pelvic instability
  - Do not inflate abdominal compartment

Trauma (con't) Other Trauma Considerations

- Criticality of Burns
  - Cover with sterile dressing (non-stick, if possible, sterile sheets may be used
  - Identify candidates for burn centers per local protocol

Trauma (con't) Emergency Medical Care

- **Assure airway position and patency - Use modified jaw thrust**
- **Suction as necessary with large bore suction catheter**
- **Provide Oxygen**
- **Assist ventilation's for severe respiratory distress and ventilate with a bag-valve-mask for respiratory arrest**

Trauma (con't) Emergency Medical Care

- **Provide spinal immobilization**
- **Transport immedicately**

Child Abuse and Neglect

- **Definition of abuse - improper or excessive action so as to injure or cause harm.**
- **Definition of neglect - giving insufficient attention or respect to someone who has a claim to that attention.**

Child Abuse and Neglect(cont'd)

- EMT-Basic must be aware of condition to be able to recognize the problem.
- Physical abuse and neglect are the two forms of child abuse that the EMT-Basic is likely to suspect.

Signs and symptoms of abuse

- **Multiple bruises in various stages of healing.**
- **Injury inconsistent with mechanism described.**

Signs and symptoms of abuse(cont'd)

- **Repeated calls to the same address.**
  - **Fresh burns.**
  - **Parents seem inappropriately unconcerned.**
  - **Conflicting stories**
  - **Fear on the part of the child to discuss how the injury occurred.**

Signs and symptoms of neglect

- **Lack of adult supervision.**
- **Malnourished appearing child.**
- **Unsafe living environment**
- **Untreated chronic illness; e.g., asthmatic with no meds.**

CNS injuries are the most lethal - shaken baby syndrome

- **Do not accuse in the field**
  - **Accusation and confrontation delays transportation.**
  - **Bring objective information to the receiving facility**

Reporting required by state law.

- **Local regulations**
- **Objective - what you see and what you hear - NOT what you think.**

Child Abuse and Neglect

Infants and Children with Special Needs

- This can include many different types of children.
  - Premature babies with lung disease
  - Babies and children with heart disease

- **Infants and children with neurologic disease**
  - **Children with chronic disease or altered function from birth**

Often these children will be at home, technologically dependent.

- **Tracheostomy tube**
- **Various types**

Complications

- **Obstruction**
- **Bleeding**
- **Air leak**
- **Dislodged**
- **Infection**

Emergency medical care

- **Maintain an open airway.**
- **Suction.**
- **Maintain position of comfort.**
- **Transport.**

Home artificial ventilators

- Various types
- Parents familiar with operation
- Emergency medical care
- Assure airway
- Artificially ventilate with oxygen
- Transport

Central Lines

- Intravenous lines (IVs) that are placed near the heart for long term use
- Complications
  - Cracked line
  - Infection
  - Clotting off
  - Bleeding

Emergency medical care - Central Lines

- **If bleeding, apply pressure.**
- **Transport.**

Gastrostomy tubes and gastric feeding

- **Description - tube place directly into stomach for feeding. Comes in many shapes. These patients usually cannot be fed by mouth.**

Gastrostomy tubes(cont'd)

- **Be alert for breathing problems.**
- **Assure adequate airway.**
- **Have suction available.**
- **If a diabetic patient, be alert for altered mental status. Infant will become hypoglycemic quickly if they cannot be fed.**
- **Provide oxygen.**

Transport

- Sitting
- Lying on right side, head elevated

Shunts

- Description - device running from brain to abdomen to drain excess cerebral spinal fluid. Will find reservoir on side of skull.
- Change in mental status

Shunts(cont'd)

- **Prone to respiratory arrest**
- **Manage airway.**
- **Assure adequate artificial ventilation.**
- **Transport.**

Family Response

- **A child cannot be cared for in isolation from the family; therefore, you have multiple patients.**

Family Response(cont'd)

- **Striving for calm, supportive interaction with family will result in improved ability to deal with the child.**
- **Calm parents = calm child; agitated parents = agitated child**

Family Response(cont'd)

- **Anxiety arises from concern over child's pain; fear for child's well-being**
- **Worsened by sense of helplessness**

- **Parent may respond to EMT-Basic with anger or hysteria.**
- **Parents should remain part of the care unless child is not aware or medical conditions require separation.**

- **Parents should be instructed to calm child; can maintain position of comfort and/or hold oxygen.**
- **Parents may not have medical training, but they are experts on what is normal or abnormal for their children and what will have a calming effect.**

Provider Response

- **Anxiety from lack of experience with treating children as well as fear of failure.**
- **Skills can be learned and applied to children.**

Provider Response(cont'd)

- Stress from identifying patient with their own children.
- Provider should realize that much of what they learned about adults applies to children; they need to remember the differences.

Provider Response(cont'd)

- Infrequent encounters with sick children; advance preparation is important (practice with equipment and examining children).

QUESTIONS